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THE

OPHTHALMIC REVIEW

A MONTHLY RECORD OF OPHTHALMIC SCIENCE

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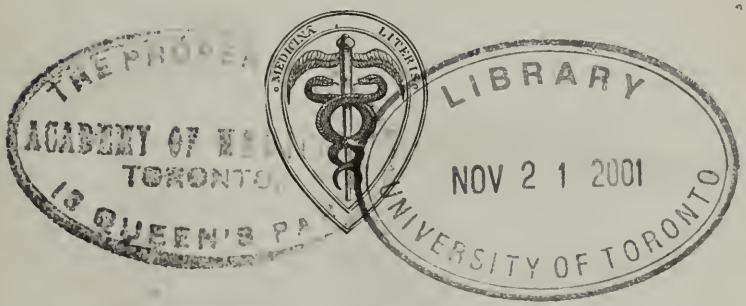

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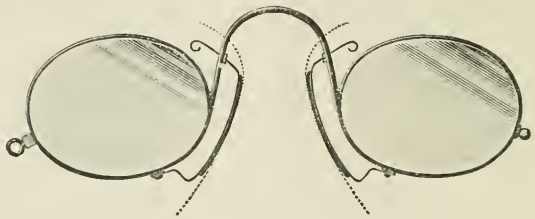

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THE OPTICAL TREATMENT OF CONICAL CORNEA.[1]

By George Mackay, M.D., F.R.C.S.E.

Assistant Ophthalmic Surgeon to the Royal Infirmary, Edinburgh.

It will, I think, be generally conceded that the optical correction of conical cornea by accurate estimation of the refraction of the eye presents very formidable difficulties. In a large proportion of cases the summit of the cone loses its transparency in the natural progress of the disease, or is rendered opaque by operative interference. In many the apex of the cone, though transparent, is found to be eccentric to the visual axis, and where it is fairly central and transparent, the astigmatic distortion produced by the sloping sides of the cone is difficult to measure and correct. I suspect that most of us will confess that in ordering glasses for the relief of this affection we have placed little reliance upon the results of objective methods of examination and depended rather upon the patient's own selection. Of course in any case of refractive error the ultimate appeal should be to the patient's own judgment and sense of comfort; but where a complicated error of refraction is present, his decision may become a mere choice of evils unless by instruments of precision, we make an approximate selection for him, based on independent optical measurements.

[1] Read at the Annual Meeting of the British Medical Association, Newcastle, 1893.

For the improvement of direct vision the problem before us is to estimate the actual state of the ocular refraction through a small area of the cornea situated as near to the visual axis as possible.

To deduce the curvature of the cornea over its most central and transparent part by measuring the corneal image of a known object at a known distance suggests itself as a method of making a beginning, but ophthalmometry on that principle involves too elaborate apparatus for clinical use, and is obviously inapplicable for the estimation of the total ocular refraction in cases where the first refractive surface of the eye is distorted. Even to measure the astigmatic error the astigmometer of Javal and Schiötz is, so far as my observation goes, of little service, for the amount of astigmatism present is apt to exceed the registering power of that ingenious instrument. Again, the direct method of ophthalmoscopy is most unsatisfactory and generally fruitless, on account of the high myopia and astigmatism which interfere with accurate focussing of the fundus.

Of the objective methods of examination there remains, retinoscopy.

A peculiar appearance of the glow from the fundus is one of the characteristic signs of keratoconus. Owing to the fact that the pupil is generally rather dilated one can distinguish a peripheral clear glow, a central dull glow and an intermediate dark ring of variable breadth and intensity. This dark ring is not the true shadow sought for in retinoscopy nor an opacity in the cornea, but an optical effect of unequal corneal refraction. At each tilt of the mirror the observer notes a revolving movement of this dark ring around the dull central glow, and in this whirlpool of light and shade his hopes of obtaining a correction by retinoscopy have often foundered.

On studying the appearances more closely one observes that the two glowing areas move quite in-

dependently. The brighter peripheral zone gives an approximately emmetropic, generally a slightly myopic and astigmatic movement. The amount of the error at this part can be estimated by fixing one's attention on the apparent movement of the glow at the pupillary edge and using lenses in the ordinary way until the movement is reversed.

The behaviour of the duller central glow is not so readily followed, but for direct visual purposes it is the part which demands our best efforts for correction. It is always a highly myopic area, and owes its apparent dulness to the high degree of convergence which it imparts to the emergent rays. It will be found easier to see what is the direction of the movement within the central spot if, while tilting the mirror, one approaches to about half a metre or even nearer to the patient's eye, provided always that care is taken to increase the distance so soon as an approximate correction is found with concave lenses. It is rather difficult to avoid being distracted by the movement of the dark ring and the outer clear zone. This difficulty may be overcome in some cases by screening from view every part of the cornea except the limited area which one wishes to correct.

For this purpose a few stenopaic discs with central circular apertures from 3 to 5 mm. in diameter are all that is necessary. Those supplied in most trial cases have smaller apertures and are generally not suitable, though of course the smaller the aperture through which the test can be applied, the more accurate is the correction likely to be. The first step is to see what is the smallest aperture through which the glow can be recognised, and its movement followed. The stenopaic disc should be supported on the back of the eye piece of a double trial frame so as not to interfere with the grooves in which the correcting lenses must be placed. To secure a proper direction of the eye which is being

examined, the other eye should be covered and the patient directed to look through the aperture first at the surgeon, and then in a direction just over his head. The correction of the refraction by retinoscopy with lenses placed in front of the stenopaic disc should then be proceeded with in the ordinary way.

The following notes will help to illustrate the method and its advantages.

In July, 1891, I was consulted by a young lady suffering from conical cornea. She was wearing glasses R.—2D sph., L.—6D sph., ordered for her by a previous adviser, and was able to see 6/60 rather badly.

By ordinary retinoscopy it appeared to me that she had a great deal of uncorrected myopia, but the conflicting movements of the peripheral glow and the central glow made a precise estimation most perplexing. I eventually concluded that she ought to require for the R.—6D sph. ◯ —4D cyl. axis 160°, and for the L.—18D sph. On testing her vision, I found that she preferred R.—3D sph., and L.—9D sph., obtaining with these R.V. = 6/24 partly, and L.V. = 6/36. Hyperbolic lenses were tried alone and in combination with concave glasses, but were found unsatisfactory; that one which gave the most assistance had the disadvantage of sharpening up secondary images of the test type. A stenopaic disc gave only a slight improvement, doubtless because it was not combined with suitable lenses. There was no time for more prolonged examination on this occasion, and I eventually ordered the glasses indicated by the patient's own choice.

On thinking over the discrepancy between my retinoscopic estimation and the patient's selection, it occurred to me that the use of a stenopaic disc during a retinoscopic examination, in the manner I have described, might be helpful. Accordingly, when my patient returned after an interval of three months, I ascertained by retinoscopy through a diaphragm of 3 mm. aperture

that the refraction about the summit of the cone was R. — 13D sph. ⌒ — 6D cyl. ax. hor. L. — 15D sph. ⌒ — 8D cyl. ax. 130°.

On testing her subjectively, still using the 3 mm. diaphragm, I was gratified to find that this correction was accepted by the R. eye giving V. = 6/12 almost perfectly, and J. 1 from 8—20 ins.

Only a slight reduction had to be made for the L. eye, which preferred—14D sph. ⌒ — 6D cyl. ax. 130°, and obtained V. = 6/18 partly, and J. 2 at 10 ins.

The interpupillary distance was carefully measured, and a pair of spectacles prescribed, having the posterior surface of each lens coated with an opaque black varnish, leaving central clear areas 2 mm. in diameter. With these she eventually obtained four letters of 6/9 with the L. eye, and was most grateful. When she next returned, a year later, I estimated the refraction again by the same method, and quite independently of my former notes, arrived at precisely the same correction as before for the R. eye. In the L. eye it appeared to me that the myopia had increased, and that it was corrected by — 18D sph. ⌒ — 6D cyl., with the axis a little more vertical than before, but she preferred the lens previously ordered, with an aperture reduced from 3 mm. to 2 mm. I have said enough to show that in this case I was enabled, by objective means, to arrive at a very close approximation to the actual state of refraction.

I may mention that in another patient, having a rather eccentric cone, with an opaque summit, I was able to satisfy myself—by the same method—of the existence of nearly 12 dioptres of myopic astigmatism near the visual axis, and to improve vision from "fingers at 1 metre" to 6/36.

This simple modification of retinoscopy which I have described, may have been practised already, but I have not seen it mentioned. I have met with cases in which it was of little service, but as it has already given me

assistance in some cases, I hope that here and there it may be helpful to others.

I have only a few words to add about stenopaic lenses. They have been so long known and prescribed, that the principles which should guide their adjustment need not be restated. They shut off so much of the field of vision that it is not desirable to order them unless preferred by the patient for the relief of polyopia, or some other fault of definition.

As I believe the opaque coating of the lenses is often prepared with material such as paper or paint, which does not adhere permanently to the glass, but is readily detached in cleaning the central area, I made enquiry as to whether it would not be possible to bake or burn some opaque substance into the surface of the glass after the lens was ground. It has been found that this can be done. The pair of spectacles which I exhibit have been made by Mr. Haddow, optician, Edinburgh.

BUZZARD (London). Atrophy of the Optic Nerve as a Symptom of Chronic Disease of the Central Nervous System. *British Medical Journal, October 7th*, 1893.

We think it well to draw attention to this interesting paper, even though it has appeared in full in a recent number of the *British Medical Journal*, and has therefore, no doubt, been already noted by many of our readers.

"Atrophy of the optic nerve," says the author, "is evidently a symptom, not a disease; it is the visible result of a structural change which itself depends upon something more properly entitled to be considered the disease from which the patient is suffering." In Dr. Buzzard's ex-

perience, "it is most frequently found associated with insular or disseminated sclerosis, next frequently in connection with fasciculated sclerosis of the posterior columns of the spinal cord (in tabes and general paralysis of the insane), least often with fasciculated sclerosis of the lateral columns." We need not concern ourselves here with the typical symptoms of disseminated sclerosis described by the author in some detail, but it is important to note that in another and less characteristic form of the disease the ophthalmoscopic appearances have proved of the greatest aid in diagnosis, namely, in that class of case which simulates hysteria, and indeed is very frequently mistaken for it. In this form of disseminated sclerosis the symptoms are usually only slightly marked, even though the first complaint of illness may have been made years before. Long intervals of apparent recovery are common. Loss of power in one or other of the lower limbs is nearly always a symptom—sometimes the only one—and the fact that after a period of exemption the paresis suddenly recurs —the exciting cause is usually a severe moral shock—and is attended with emotional manifestations, may account for the frequent failure to discriminate between this type of disease and hysteria proper.

Two such cases are shortly described by the author. In one there was diplopia, slight nystagmus, pallor of discs with their margins sharply defined, while the inner edge was of a dead-white colour. In the second there had been diplopia, but this, with other paralytic symptoms, had passed off, only to be succeeded years later by definite limitation of the visual field in each eye and well marked atrophy of both discs. There was no distinct tremor of limbs in this case, but the knee jerks were exaggerated, and ankle clonus distinct.

The author goes on to discuss the frequency of optic atrophy in disseminated sclerosis, and comes to the conclusion that it is much more commonly present than has been supposed. Out of 100 cases he found no fewer than forty-three in which there was pallor of the discs, more or less marked. Uhthoff gives a still higher percent-

age. Of 100 cases of disseminated sclerosis he found only forty-eight in which the fundus was normal, while of the forty-eight there were five in which there was a history of impaired vision, although the discs presented no atrophic change. The writer quotes Uhthoff's observation that with the exception of cerebral tumours and tuberculous meningitis there is no disease of the nervous system (even including tabes) which is so often accompanied by ophthalmoscopic changes as disseminated sclerosis, and he (Uhthoff) divides the changes at the papilla into four separate classes, viz.: (1) atrophy and loss of colour throughout; (2) incomplete decoloration of the papilla, the internal parts preserving a slight reddish reflection; (3) decoloration of the temporal part of the discs alone, the nasal side remaining normal; and (4) hyperæmia and prominence of the papilla with the appearance of optic neuritis.

With this classification Dr. Buzzard in the main agrees, but adds that although he has several times observed dark grey discoloration of the disc, resembling the tint of hyperæmic grey matter of the cerebrum, the condition has yet never been such as would, in the ordinary sense, be designated papillitis. He thinks that the intense hyperæmia, to which he refers, is only exceptionally present, and that the great majority of cases never have this appearance. His explanation, to quote his own words, is that "in most cases the neuritis (like the islets of interstitial myelitis constituting the early stage of disseminated sclerosis) is in the form of a patch affecting some portion of the optic nerve or tract, more or less distant from and behind the globe, and that the pallor of the disc most commonly observed is due to connective tissue overgrowth and atrophy of nerve fibres resulting from this. If the lesion affects the nerve as it enters the globe the appearance described above is visible to the eye, but this is only exceptionally the case."

With reference to the character of the visual loss in cases of disseminated sclerosis we may again quote Uhthoff, who describes four varieties of visual field, thus: (1) central

scotoma with retention of the periphery of the visual field; (2) central scotoma with concomitant contraction of the periphery of the visual field; (3) peripheral contraction of the visual field, which is irregular, with relatively intact central vision; and (4) concentric contraction, regular, analogous to that of hysteria. This last he has found to be the rarest form—one in twenty-four cases. The loss of sight is very frequently unilateral, and when bilateral, then not symmetrical. Sometimes the onset is sudden, sometimes gradual. Again, the visual impairment may be one of the earliest manifestions of the disease, perhaps quite the earliest, while in other cases it does not come on till the malady has made considerable progress. It is very unusual for the sight to be entirely lost, as was pointed out by Charcot, and Buzzard confirms this observation; he has never seen a case of disseminated sclerosis where the patient was unable to distinguish light from darkness.

One or two interesting points bearing on the colour vision of the cases under discussion are brought out by the writer. It is known, of course, that in the normal eye between the outer limit of the red or green field and the outer limit of the white field, there is an area of retina in which colours are not recognised as such, but are described as black or white according to the amount of white light which they contain; thus in this colour-blind area, green, the whitest colour of the spectrum, appears as light grey or white, red as dark grey or black, yellow as white, blue as black. Now, in many cases of disseminated sclerosis and tabes, there is a concentric diminution of the field of vision, and in these cases, the rule above referred to is found to hold; thus the white field is diminished, as also the fields for red and green, and between the outer limit of the white field and that of the red or green field is a zone in which red appears black and green white. It has recently been noted by Dr. Head, that in those cases of disseminated sclerosis with so-called hysterical manifestations, where there may be no visible alteration of the disc, similar fields appear; and their presence, adds the author, should always put us on our guard against diag-

nosing "hysteria." Charts of the fields in different cases illustrate Dr. Buzzard's paper. The contrast between the field of a patient, the subject of typical hysterical fits, and the fields in two cases of disseminated sclerosis of the hysterical type is very well brought out; in the two latter the colour-blind zone to which reference has been made is clearly defined, while in the former it is completely absent.

Transitory blindness in disseminated sclerosis is, in the writer's opinion, a symptom of considerable frequency; he has noted it in five out of eighteen cases, but has not complete statistics on the point, and strongly suspects that the proportion is a good deal larger. He cites a few instances which, however, we need not refer to.

The question of the relative frequency of optic nerve atrophy in tabes dorsalis as compared with the same occurrence in disseminated sclerosis is an interesting one. Dr. Buzzard's figures do not tally with the general opinion on this point hitherto held by ophthalmologists. Of fifty-six cases of tabes seen in hospital, only nine, or sixteen per cent. had discs showing atrophic changes, while among 100 cases in his private practice, he found fifteen with more or less pronounced atrophy. Putting the two together, we get an aggregate percentage of 15.3, hardly more than a third of that—43—in disseminated sclerosis.

The whole paper is an exceedingly interesting and suggestive one, and it behoves ophthalmologists to examine their cases of "retro-bulbar neuritis"—another name, by the-way, in many instances, for a confession of ignorance—with a view to determining whether they are not, more often than has hitherto been recognised, really examples of the hysterical form of disseminated sclerosis, the type in which, in its early stages, the characteristic symptoms are either entirely absent or but very feebly expressed.

N. M. ML.

GROENOUW (Breslau). On the Visual Power of the Peripheral Portions of the Retina, and a New Method of Testing it. *Archiv. für Augenheilk., xxvi., reviewed in Centralblatt für Augenheilk. Supplementheft*, 1892.

Working on a system of his own devising, Groenouw has made some interesting investigations on this subject. He tests the visual power in regard to two functions: first, the capacity of recognising a small point which differs from its surroundings (Punktsehschärfe, he calls it; we might employ the term Visual Minimum); and second, the power of recognising as discrete two or more objects (Distinktionsvermögen or Formsinn—Form-sense in our terminology). In Groenouw's nomenclature that portion of the retina which is covered by the image of the smallest point visible is called a physiological point or unit. For the investigation of this matter it will not do to utilise a small bright point such as a fixed star, because, owing to the imperfections of our refractive media, a circle of diffusion is formed, giving too large an image. The author, therefore, prefers a black dot or point on a white ground, and his first step was to ascertain by experiment on himself that a physiological standard may be made by means of Chinese ink on white paper, whose visibility is not affected by alteration—within visible limits—of the illumination. For examination of the form-sense he used two black marks on a white ground, separated by an interval equal to the diameter of each.

In the examination, Groenouw employed a white card equal in breadth to the arm of the perimeter and corresponding in length to 6°, the card bearing at its centre a small black dot; this was moved centripetally until the person examined was able to recognise the presence of the black mark. The size of the physiological point enlarges as one proceeds from macula to periphery, quickly at first, more slowly the farther one proceeds from the centre; but the increase is not equal in all directions, the limiting lines of the area over which a point of a given size is recognised

running approximately parallel to those of the field of vision. The recognition of a black spot on a white ground is not a function of the light sense, as previous experiment has shown that such a spot is always recognised under the same visual angle, even if the contrast between object and background diminishes; and we can also dismiss the objection that the visibility of a point whose image is smaller than a retinal element depends upon its brightness as compared with its background, since in this method we use only points which throw images larger than single retinal elements. The above facts are shown to be as true for the periphery as they are for the macula, for the author's experiments prove that results obtained with an object thirteen to sixteen times darker than the background differ scarcely at all from those brought out with an object only five to eight times darker. So long as a strong contrast exists between object and background, the actual difference is of slight moment.

The increase in size of the physiological point cannot be explained by differences in refraction between the central and the peripheral portions of the fundus, nor is it due to the inferior distinctness of images falling peripherally, but, as we are assured, to a diminished sensitiveness of the nerve elements as one approaches the periphery.

Investigations as to the distinction-capacity or form-sense of the periphery are very difficult to conduct, and show that there is no constant relation between the size of the physiological point and that of the area of its perception by the retina. Nor is the investigation of the visual acuity (in the narrow sense of the word) at the periphery of much value, because under physiological conditions that part of the retina is not in the habit of apprehending form definitely, but is only concerned to direct our attention to objects contrasted with their surroundings, particulars of which are not appreciated until we turn our gaze upon them. We possess extreme readiness of perception of movement at the periphery, but our form-sense over that area is so little developed that examination of it is entirely out of the question. On this account it is sufficient

merely to establish the size of the physiological point, for without a coincident enlargement of it a lesion of form-sense could hardly occur in eye disease.

Groenouw proposes to revive Hirschberg's abandoned terms of *Isopteric* and *Isomorphopteric* lines; the former meaning boundaries of equal point-perception, and the latter those of equal form-perception. He has tested certain pathological cases in the above respects, and has found the methods above described to form a more delicate test for slight lesions than do those conducted with coloured objects. Many cases exhibited defects in the field which were not brought to light by other methods.

W. G. Sym.

A. Birnbacher (Graz). Calcareous Deposits in the Cornea removed by Chemical Means. *Klin. Monatsbl. f. Augenheilk, June*, 1893, p. 183.

The author relates two cases in which the treatment of calcareous deposits in the cornea by the local application of dilute hydrochloric acid gave remarkably good results.

A woman, aged 60, presented herself with conjuntival and ciliary injection, photophobia, and discharging tear sac; the epithelium over the lower two-thirds of the cornea loose and readily separating in shreds; beneath it a smooth, thin film of a saturated white substance, appearing finely granular in its lowest part, and thinning off as a semi-transparent grey opacity into the clear cornea above. An attempt to scrape away the white substance showed that it could be removed only in fine particles and with difficulty. The anterior chamber and iris were normal; the tension normal. The opaque as well as the transparent parts of the cornea had normal sensibility. Vision with this eye was reduced to counting fingers at four metres. The

underlying cornea, where denuded by the removal of the particles, appeared to be clear. Examination of the urine showed neither sugar nor albumen, and no excess of uric acid. The removed particles of the white incrustation proved to be soluble in hydrochloric acid, and to consist, in all probability, of calcium phosphate.

Cocaine having been used, the corneal epithelium was carefully removed with a hair pencil, and then with the same instrument a five per cent. solution of hydrochloric acid was applied. The opacity cleared immediately, leaving only a faint greyish cloud in the superficial layers of the cornea. The acid was then neutralised by a five per cent. solution of carbonate of soda. Fourteen days later all irritation had subsided. The cornea was bright and clear, only a faint striped opacity being discoverable in the lower part by focal illumination. Vision had risen to 6-18ths, and this condition remained permanent when re-examined two months later.

The second case was that of a man aged 81, whose right cornea presented near the lower margin a narrow band of white opacities with sharp contour, and in the upper part three similar but smaller opacities. The epithelium over the opacities was entire and brilliant. The anterior chamber, pupil, media and fundus showed no abnormality. The same treatment as in the previous case was employed, and resulted in the complete removal of the opacities, no cloud remaining visible even under focal illumination.

Microscopical examination of the portions of opaque substance removed by scraping showed that the precipitate consisted of minute strongly refracting granules which were situated in Bowman's membrane, and to a smaller degree in the immediately subjacent corneal tissue. As causes of the lime precipitation in the cornea the author points to the greater percentage of lime salts in the blood of old people, and to the effect of localised disturbance in the circulation ; temporary arrest of the blood circulation in the renal arteries leads, according to Litten, to calcification of the epithelium in the uriniferous tubes. It is probable that the enlargement of the marginal plexus of

the cornea seen in such cases as the above is associated with some degree of stasis in the blood stream and in the lymph streams of the cornea. P. S.

FUKALA (Pilsen). On the Etiology of Chalazion. *Centralblatt für prakt. Augenheilk, Oct.*, 1893.

There is no difference of opinion as to the clinical and anatomical character of chalazion, but its etiology is still a subject of dispute. The view which is almost universally held is that advocated amongst others by Fuchs, viz., that chalazion is the product of a preceding morbid process in the Meibomian glands and is directly attributable thereto. Changes which interfere with the function of these glands and which prevent the escape of their contents, thus leading to distension with resulting inflammation, are followed in due course by the formation of a chalazion. As a confirmation of this, it is usual in these cases to find the mouths of the Meibomian glands partially or completely occluded, and their secretion abnormally thickened. In opposition to this apparently obvious explanation, however, Dr. Deyl, of Prague, has recently attempted to prove that chalazion is directly due to a specific micro-organism—chalazion bacilli, he calls them—and is not the consequence of interrupted outflow from the Meibomian glands. He supports his contention in the first place by the fact that after the application of irritants such as croton oil, turpentine, hot needles, &c., to the edges of the lids in rabbits, whereby the orifices of some, at least, of the Meibomian glands must have been closed, he was unable in a single instance to produce chalazion. The argument, however, will hardly bear investigation, first because it is not known, we think, that rabbits are subject to chalazion, and secondly because a merely negative result is always a dangerous prop to place much reliance on, more especially if one is attempting to overthrow a widely credited view.

Secondly, Deyl has described the bacilli which he dis-

covered in chalazia and has further found that after injecting them under the palpebral conjunctiva in rabbits, small abscesses have appeared which, some weeks later, became organised into little swellings; these swellings or nodules according to Deyl contained the specific chalazion bacilli. Going still a step farther he found that when he injected the suspended bacilli into the Meibomian glands no chalazion resulted; moreover he is convinced that in several cases where he has, in this way, brought about these small swellings—true chalazia he believes them to be—there was no connection between them and the Meibomian glands, or if the gland was involved it was so only secondarily. This, if confirmed, would indicate that the origin of the nodule was not the Meibomian gland, and again, if Deyl's assumption be correct that the nodules were really chalazia, would go some way to maintain the correctness of the view which he advocates. But we confess that the "ifs" are too numerous and too important to permit us to accept his theory without question.

As regards the actual bacilli which he describes, it is unnecessary here to go into detail about them. It is sufficient to say that they would seem to be very variable in size and appearance, and that he has found them not only in chalazia, but also in various inflammatory affections of the eye, such as blenorrhœa of infants or adults, muco-purulent conjunctivitis, and even diphtheria. We cannot but agree with the author, whose one object in writing his paper seems to be to oppose Deyl's views, that bacilli which are so varying in character and so indiscriminate in their choice of situation, can in no sense be accurately described as specific chalazion bacilli.

Fukala has entirely failed to find micro-organisms in many examples of non-inflammatory chalazion which he has examined, both fresh and after they had been hardened in alcohol. But there is a form of the disease usually more distinctly inflammatory which sometimes follows the use of collyria or atropine, and that in patients who had never been subject to it before. The author at first thought this might be due to the micro-organisms

contained in the solution, but found that the same result followed the use of atropine solution which had been carefully sterilised. He is now of opinion, therefore, that the effect is due to the chemical action of the drug acting chiefly on the mouths of the Meibomian glands, and, in accordance with the generally accepted theory, provoking inflammation by preventing the normal escape of their secretion.

Other investigators have also examined chalazia from the bacteriological point of view, but the consensus of opinion seems to indicate that so far there is no evidence of their containing any special micro-organisms which can be recognised as distinctive to themselves.

N. M. ML.

DEBIERRE (Paris). **A Case of Symmetrical Swelling of the Lacrymal and Parotid Glands.** *Revue Générale d'Ophtalmologie, Oct.*, 1893.

The patient, a coachman 27 years old, was a healthy man and had never suffered from any serious illness; he had varicose veins in the lower limbs and some pityriasis versicolor on the chest. The teeth were irregular but otherwise normal. In March last he consulted the author for a swelling of the right upper eyelid which had come on gradually and painlessly in the preceding fifteen days, and had given rise to a little difficulty in the play of the lid. The skin of the upper lid of this side seemed raised, chiefly towards the outer canthus. On the left side there was a similar condition but less marked. The skin had retained its normal appearance, there was neither redness nor any undue development of vessels. Palpation on the right side at the upper and outer part of the orbit revealed the presence of a tumour about as large as a filbert, whose base seemed to be adherent to the orbital wall; its surface was smooth, it was quite painless, of bony hardness, and absolutely immovable. On the left side there was a swell-

ing identical in character but considerably smaller. At the level and behind the angle of the lower jaw on the left side, the writer discovered another swelling, also hard and painless. The same state of affairs was present over the right parotid region, although the swelling here was hardly so defined. The throat and nose were normal, the conjunctiva healthy, sight was perfect in both eyes, the ocular movements full; there was no trace of diplopia. Careful investigation elicited from the patient no history of syphilis or rheumatism; tubercle and cancer were unknown in his family.

The author was doubtful of the nature of these swellings and accordingly adopted the safe policy of ordering iodine to be taken internally and mercurial inunction applied to the upper lids, at the same time urging the patient to return as soon as possible. This he did in about a fortnight's time, when the tumours were found to be almost *in statu quo;* if anything the swelling in the right orbit was less defined than before. On the occasion of this visit M. Meyer was asked to give his opinion on the case. He confirmed Debierre's observations with reference to the bony hardness and complete immobility of the growths, but in view of their situation decided that they were probably affections of the lacrymal glands analogous to those described by De Wecker and Masselon a short time ago.[1] He recommended iodide of potassium in progressively increasing doses. M. Panas also saw the case and made a similar diagnosis. He thought the swelling was chiefly in the anterior part of the lacrymal glands; he cited another example of the same condition, except that the parotids were unaffected, in a rheumatic lady who had been under his care for six months for orbital swellings; they had gradually disappeared under the use of iodide of potassium and small doses of arsenic; he regarded the simultaneous enlargement of the lacrymal and parotid glands as a mere coincidence, and not in any way as an essential factor.

With reference to the nature of the growths, Debierre

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[1] *Archiv. d'Ophtal.*, Feb., 1892.

cannot believe that in his patient the condition is a malignant one. It was impossible to remove any part of them for histological examination, but the man's health is good, there is no debility or anæmia, nothing, he thinks, to suggest lymphadenoma or malignant disease. In a case, however, seen by Fuchs, and examined microscopically, changes were found resembling those of lymphoma; here the patient's health at the end of a year was also good, while the growths had neither decreased nor enlarged.

These cases are interesting and worth recording. Opinion as to their nature seems to be divided and farther observations, both from a clinical and histological standpoint, are required with a view to determining the question of their true character. N. M. ML.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, OCTOBER 19TH, 1893.

D. ARGYLL ROBERTSON, M.D., F.R.C.S.Ed., President, in the Chair.

Introductory Address.—The President thanked the members of the Society for electing him to the chair. After referring to his predecessors in office, and more especially to Sir. Wm. Bowman, he went on to the more immediate subject of his address, viz., the services that ophthalmology has rendered to general medicine and surgery in respect of treatment of disease. Beginning with errors of refraction and nervous disorders, he said: The contributions which our speciality has made to general medicine in regard to diagnosis and prognosis are universally recognised, and have been made the subject of many addresses, and even of important works, but I venture to think that our speciality has contributed not a little towards the progress of medicine in respect of the treatment of disease, and I propose to refer shortly to a

few of the practical benefits thus rendered to general medicine.

I have at the outset to acknowledge that as regards the treatment of disease—the end and object of all our labours —the benefits conferred by ophthalmology are few and small compared with those which refer more particularly to diagnosis. But inasmuch as a correct diagnosis is an essential preliminary to successful treatment, even in this indirect way our speciality may claim to have accomplished something. But it is more particularly the direct therapeutic services rendered by ophthalmology that I desire to consider.

And first of all we may claim that ophthalmology has suggested lines of treatment which have proved of the greatest service in remedying conditions otherwise difficult of alleviation or cure.

We have instances of this in the cure of headaches of neuralgic type, found intractable even under prolonged general medical treatment, sometimes attended by such severe gastric disturbance and grave general symptoms of *malaise* as to lead to the suspicion of the possible existence of serious cerebral lesion, and yet in which the adaptation of suitable spectacles to correct an error of refraction, or the performance of an operation on the muscles to overcome some latent tendency to misdirection of the eyes, will serve to dispel all the serious symptoms and bring peace and comfort to the patient.

Cases of this kind, of a more or less severe type, have long been familiarly known to oculists, but it is only comparatively lately that the profession, as a whole, has recognised the extent to which such conditions prevail, and the benefit that may result from such simple measures.

That even epilepsy may in some instances be produced by ocular strain has been and is maintained by some, and, without going so far as to adopt this view, I think I am amply warranted in saying that in some cases of epilepsy the fits may at any rate be aggravated if not induced by uncorrected refractive error.

The Surgery of the Tendons.—As my next example I shall

select the treatment of certain muscular disabilities by the shortening of tendons. The ophthalmic surgeon has for long been accustomed to improve the movements of the eyeball in some conditions by the operation known as "advancement" of the tendons, while the general surgeon, although long accustomed to deal with muscular deformities by cutting tendons through, is only now learning from us to deal with the elongated and weakened muscles after our methods.

My friend and colleague, Professor Chiene, tells me that he is accustomed to point this out to his class, and that he has employed an operation for shortening the tendons in practice with some measure of success. And I observe from the current number of the *British Medical Journal*, that some American surgeons are following the British example and working in this line.

Cocaine.—As my next example I shall select a therapeutic agent mainly introduced by ophthalmic surgeons. I refer to the employment of cocaine as a local anæsthetic. It is true that cocaine was first used as a local anæsthetic in laryngeal surgery, but a more general knowledge of the efficacy of the drug in producing local anæsthesia during operations, its applicability by hypodermic injection to operations on the surface of the body, and its value in allaying pain in many irritable conditions, dates from its general employment in ophthalmic practice. I do not think I exaggerate the benefits derived from the use of cocaine when I claim that by its employment in place of a general anæsthetic in many thousand cases several lives have probably been saved, as experience has shown that a large proportion of the deaths from chloroform have occurred where the surgical operations to be performed were minor ones.

Ophthalmology as a Therapeutic Testing Ground.—Apart from services such as these, I should like to observe that ophthalmology has afforded a testing ground for not a few remedies of repute. This is quite what might be expected when we consider that in consequence of its peculiarity of structure

the eye affords an opportunity of watching the effect of treatment on deeply-seated tissues, such as is presented by no other part of the body.

Mercury.—Thus in regard to the effect of mercurial treatment in syphilitic affections it may be justly claimed that the eye has been the ground on which the value of the remedy has been tested. Anyone who has seen an inflammatory thickening of the iris of syphilitic origin, which had resisted treatment for weeks, steadily disappear as the mercury was cautiously pushed, must necessarily have faith in the employment of the drug in similar inflammations of other parts. He who has watched a syphilitic choroiditis yield under the same conditions has his faith further strengthened, and I fancy that we might search in vain among ophthalmologists for sceptics on this subject. When ophthalmic demonstrations are so readily accessible to members of the profession, it fills me and some of my friends with indignation to find practitioners of repute calmly pooh-poohing the employment of mercury in syphilis. Admittedly damage was done by the remedy when it was employed with reckless unwisdom, but to withhold it in our present state of knowledge may, in my judgment, be justly condemned as malpraxis.

Local Depletion.—Another example is afforded by the demonstration of the beneficial effects of local depletion. These are nowhere more marked than in the acute deeper-seated inflammatory affections of the eye. There are few, if any, ophthalmic surgeons who cannot recall instances of great and immediate relief experienced by the patient suffering from acute iritis, cyclitis, or glaucoma, from the application of a few leeches to the temple. Not merely does the patient obtain mitigation of pain, but the inflammatory injection of the eye is reduced, and often local applications, which previously failed to produce much benefit, after the bleeding prove rapidly efficacious.

I desire to record my opinion very strongly in favour of local depletion in such cases, as I fear there is a tendency, even at the present day, to underrate the ad-

vantages that may be obtained by this remedy. This view is strengthened by a statement made to me by Messrs. Duncan and Flockhart, the chief druggists in Edinburgh, with regard to the demand for leeches at the present time. They inform me that forty years ago they paid for ten times the number of leeches in the course of the year that they do now. When it is considered that the business of this firm has greatly increased in the course of these years, and also that a large number of druggists who formerly imported leeches do not do so now, but get any supply they need from one or two firms who do, it is at once evident that the employment of leeches has fallen greatly into disuse. There is no question that depletion, both local and general, was abused in olden days, but there may be, and in my opinion is, an unwarranted neglect of that most powerful and valuable remedy at the present time. I readily recall an instance of the great benefit of leeching in the case of an eminent professional friend to whom I was called in consultation, who had been affected with acute rheumatic cyclitis for a fortnight, and whose sufferings, especially at night, had been extreme, only partially relieved by opiates; in whom the usual local applications had been employed without avail, and where on the application of a few leeches to the temple, the most welcome relief was obtained. As the blood was withdrawn by the leeches, pain subsided, and delicious soothing sleep ensued. As he himself expressed it, he would ever after include leeches among his best friends.

Counter-Irritation.—Another example of a somewhat discredited method of treatment is that of counter-irritation. Blisters, like leeches, can scarcely be ranked among agreeable remedies, but my experience as an oculist has convinced me of their value also. I appeal to your experience as to the effect of counter-irritation in subacute corneal inflammations and ulcerations. Have you not found its action as striking in them as the surgeon is accustomed to find it in the somewhat analogous condition of inflammation and ulceration of articular cartilages? But I think something further may be learnt from studying the effects

of different methods of producing counter-irritation in corneal affections. As the result of clinical experience and observation I am inclined to believe that the efficiency of counter-irritation very much depends upon the relation of the part blistered to the inflamed organ. In other words, to produce a thorough effect the region of irritation must bear some close and definite nervous relationship to the part inflamed. We are not yet able from anatomical considerations to fix on these regions, and it is only clinical experience or experimental investigation that will serve as a guide. Thus I am convinced that irritation produced in the eyelids has a much more subtle influence in altering the vascular condition of an inflamed eye than an irritant application to the temporal or postaural regions. I have often had cases that had been subjected to the application of fly blisters to the temple or behind the ear, or even had a seton introduced over the zygoma, with comparatively little benefit, but where blistering of the eyelid was followed by rapid and marked improvement.

If you will bear with me I should like to describe a method of counter-irritation that has been employed in Edinburgh for, at any rate, above thirty years, and which is to my mind by far the most efficient. It consists in moistening the skin of the upper lid, and then rubbing a stick of lunar caustic three or four times across the moistened surface. Within a few minutes a burning pain is experienced in the lid, the skin becomes reddened and the lid œdematous, while the epidermis at the part to which the caustic was applied presents an ashy grey tint. The severe pain lasts from half an hour to an hour, but the surface of the lid remains tender to the touch for two or three days. The œdema speedily subsides. A black crust, consisting of the deadened epidermis tinted by the silver, forms on the surface, but is cast off in the course of six or eight days, and leaves no permanent mark behind. I am willing to admit that some of the beneficial effect may be attributable to the rest of the eye and freedom from friction produced by the œdema of the lid, and also in part to the circumstance that the tender surface of the

lid prevents the patient constantly rubbing the eye, but I am inclined to view the intimate nervous relationship between the lid and the globe as the main explanation of the great advantage that results from this form of counter-irritation. Let general physicians and surgeons who stand in doubt as to the utility of blisters observe for a few weeks their value in eye cases, and I think they will soon have their doubts resolved.

Antiseptics.—As regards the determination of the value of various antiseptic substances, the eye affords a field for inquiry unequalled by any other part of the body. A healing process that will suffice for all purposes in a wound of the skin may in the cornea leave so dense a cicatrix as materially to diminish or entirely frustrate the beneficial result of an operation. To obtain a perfect result the tissues during the healing process must remain aseptic. Hence the extensive investigations that have already been made by ophthalmic surgeons—investigations that have materially advanced the knowledge of the profession as to the relative value of different antiseptics.

In connection with this matter I may be allowed to refer to my experience of the antiseptic properties of nitrate of silver—a substance which unfortunately, on account of its irritant properties, its liability to decomposition, and its tendency to stain, may never be extensively employed as a simple antiseptic. Its antiseptic virtue, however, I can fully substantiate from the following experience.

Many years ago I was surgeon to the Edinburgh Eye Dispensary, in which institution at that time the surgeon occupied a seat in front of a desk on which were stationed various bottles containing solutions for application to the eyes. Among others there were three bottles with solutions of nitrate of silver of different strengths, that of ten grains to the ounce being the one most commonly used. Each of these bottles was furnished with a camel's hair brush, which was allowed to remain in the solution. Most cases of conjunctival inflammation that were at all severe had a little of the caustic solution applied to the conjunc-

tiva, and in all cases the same brush was used. Now in these days cases of purulent ophthalmia, particularly in the infant, were not very rare, and I have often, in applying the nitrate of silver, brushed off some of the purulent secretion, replaced the brush, with the septic matter attached to it, in the bottle, and in the course of a few minutes used the same brush and solution to a simple conjunctival case. Yet in no instance did inoculation occur. I confess I was taken aback the first time I saw my late colleague, Mr. Walker, act in this way, but he assured me he had done it for years without any bad result, and my observation afterwards confirmed his.

This experience led me to put considerable faith in the employment of nitrate of silver solution in the early stage of septic inflammation following an operation, from which application I have in many instances obtained considerable benefit. This, however, like almost all of our most efficient antiseptics, only acts on the surface, and does not readily sink into the tissues, and, as it were, follow after the septic germs to destroy them. No doubt pyoktanin solution (for the introduction of which agent into practice we are indebted to an oculist) does penetrate the tissues, but it appears to be a feeble antiseptic, and thus fails to effect the wonderful works ascribed to it when first brought forward. I am, however, inclined to attribute considerable beneficial effects to its employment in some cases of sympathetic ophthalmia, and think this drug worthy of being further tested, perhaps in considerably stronger solutions than are usually recommended.

Rest; Atropine; Massage. — As regards the therapeutic effects of rest, little is needed in the way of demonstration. Its value is recognised in all departments of medicine. In the eye we have abundant instances of it, one of the most striking, perhaps, being the restoration of the visual function under dark goggles or shades in those cases where the function of the retina has been exhausted by over-stimulation by exposure to bright glare and the condition of functional nyctalopia has been produced.

The benefit arising from the use of atropine in cases of iritis or cyclitis may, too, at any rate in part, be viewed as illustrative of the beneficial influence of rest effected by paralysing the inflamed muscles.

I might refer to the demonstration of the curative effects of massage by the promotion of absorption in chronic scleritis and some corneal opacities, to the evidence of the value of iodides in tertiary syphilis, as seen in specific inflammatory affections of retina and choroid, or of salicin in rheumatic inflammations of sclerotic or iris; but I think I have advanced enough evidence to prove that ophthalmology has already rendered considerable service to general medical and surgical therapeutics, and that the eye is a most favourable field for the investigation of many therapeutic problems. What has been in the past will be in the future, and I trust the day may never come when specialities shall not remain in closest touch with each other, and all with general medicine and surgery.

One Hundred Consecutive Cases of Epilepsy; their Refraction and Treatment by Glasses.—This paper was read by Mr. H. Work Dodd. In these cases the observations included examination of the pupils and fundus oculi; the determination of the vision and refraction before and after mydriasis; and the result of treatment by glasses. The diagnosis of epilepsy was independently confirmed by the physician in attendance at the West End Hospital for Nervous Diseases, where the patients were seen; the results were compared with a classification of percentages from fifty cases of apparently normal eyes which had been worked out in the same manner. The comparison showed that of simple hypermetropia there were 28 per cent. less in the epileptic than in the apparently normal class; of astigmatism there were 26 per cent. more in the epileptic division than in the normal one, the amount being made up mainly of compound hypermetropic astigmatism. Of the 100 consecutive cases of epileptics, 75 were ordered to wear glasses; of these there were 23 who either did not wear them or failed to report themselves later, and could not be found. Of the remaining 52 cases there were: (*a*)

13 who had no fits since using glasses, during periods varying from one year to four months; (*b*) 3 cases who had remained *in statu quo;* (*c*) 36 cases whose condition had improved since wearing the glasses; in the majority of these the improvement was marked. In all the cases the physician had continued his ordinary treatment. It seemed to result that, given a certain condition of instability of the nervous system: (*a*) errors of refraction might excite epilepsy; (*b*) the correction of errors of refraction would, in combination with other treatment, in many cases cure or relieve epilepsy; (*c*) in some cases, when the refraction error had been corrected, the epilepsy would continue, generally in a modified form, in consequence of other irritation, even though the error of refraction might have been the exciting cause of the epilepsy.

Dr. Beevor thought that treatment by bromide or other drugs should be entirely discontinued for some months, and the cases watched carefully before they were accepted as cured.

Rapidly Growing Sarcoma in a Child involving both Orbits with Secondary Growths.—Mr. Snell reported this case. The patient, a boy, aged 4, was well up to November, 1892, when he had an attack of mumps. His trouble appeared to follow this immediately, but later inquiry had elicited the fact that he sustained a slight blow over the left eyebrow in the previous July from a pump handle. Swelling of the lids resulted, but entirely disappeared again after a fortnight. This was thought nothing of, and was forgotten until repeated inquiries as to injury were made. By January the left eyeball was noticed to be prominent, the right in February. The left, which was always the worse, increased more than the right. He was admitted to the infirmary on March 8. He was then very emaciated and anæmic. The left globe protruded forwards, but also downwards and slightly outwards; a swelling in the orbit above the eyeball and a feeling of growth in the orbit were detected. On the right side the conditions were much less marked. There

were ecchymoses in both upper lids, and there had been epistaxis. The fundus oculi on both sides was normal, and vision apparently unaffected. There was a large swelling of the left temporal region reaching from the orbit to the ear, with large veins coursing over it. Rapidly the orbital growth developed; on the left side especially, the eyeball became more protruded and the cornea sloughed, the pre-auricular and cervical glands became enlarged, the growth in the left temple got larger, and one developed in the right temple, as did one over the coronal suture of the left side. He died on March 19. At the necropsy, on reflection of the scalp, four swellings were noticed, one on either side near the coronal suture, and the other two near the parietal eminence on each side; they were dark purple in colour, and the two last were about the size of five-shilling pieces. They were under the periosteum involving the bone; in addition, the temporal fossa on each side had a tumour. Both orbits were filled, the roofs being bulged upwards and backwards; the growth involved the upper and inner parts, and was continuous across the interorbital space; the dura mater was thickened, the inside of skullcap bulgings corresponding to external ones. There was a large number of affected glands in the abdomen. The microscopic characters were those of a rapidly growing sarcoma. The relation of trauma and mumps as a cause in this case was discussed, and it was mentioned that the lacrymal gland was unaffected.

Case presenting Unusual Appearances after Cataract Extraction; simulating Cyst, but really due to a Distended Capsule.—Mr. Simeon Snell related particulars of this case. The patient, a woman, in 1879 had been operated on for cataract in the left eye. The note then entered was "S. F., aged 39; shallow lower flap; lens removed with vectis; little vitreous escaped; July 1, V + $4\frac{1}{2} = \frac{20}{30}$, and reads J. 1 easily with + $2\frac{1}{4}$." About six or seven years ago the patient noticed a small white body in front of the pupil; this gradually increased in size. When seen this year it was found to

occupy an extent equal to more than half the length of the cornea ; it was pear-shaped, the thicker end being up and inwards. It often disappeared behind the iris, but was generally in the anterior chamber. It had a very slender attachment to the iris at the back below. In July it was removed through a small peripheral corneal section below and outwards; V with correction = $\frac{6}{6}$. Mr. Treacher Collins kindly examined the specimen and found that it was not a true cyst but composed of the lens capsule with some degenerate lens substance in the interior.

Autochromatic Plates in Photography of the Interior of the Eye. —This paper was read by Dr. Howe. The great advance made by the discovery of isochromatic plates in photography of the fundus oculi was pointed out by the author. Specimens of the latest photographs of the fundus oculi were shown.

Demonstration of Ophthalmotrope.—Dr. Landolt (Paris) demonstrated his ophthalmotrope, an instrument whose object was the demonstration of the direction and the position which the eye takes under the influence of each of its muscles, and the position of the false image in the case of paralysis of a given muscle.

Card Specimens.—The following card specimens were shown :—Dr. Beaumont : Neoplasm of the Iris.—Mr. Rolston : Traumatic Dislocation of both Lenses.—Mr. Treacher Collins: Specimen showing the Eyelashes carried into the Vitreous Chamber by a Woman with a Knife.—Dr. Balmanno Squire : A case of Lupus Vulgaris involving the Eyeballs.—Dr. S. Stephenson : A Modified Desmarres' Retractor.—Mr. Ernest Clarke : A Case of Slight Enlargement of the Right Thyroid with Graefe's Sign on Right Side only.

THURSDAY, NOVEMBER 9TH, 1893.
HENRY POWER, M.B., F.R.C.S., Vice-President,
in the Chair.

Neoplasm of the Iris.—Mr. Lawford read the report of the Committee on Mr. Beaumont's case of Neoplasm of the Iris.

Benzoyl-pseudo-tropeine as a Local Anæsthetic in Ophthalmic Surgery.—This paper was read by Mr. T. J. Bokenham. He said benzoyl-pseudo-tropeine, or tropa-cocaine, was a new cocabase extracted from the small-leaved coca plant of Java, and was identical with the pseudo-tropeine obtained from hyoscyamus. The alkaloid as obtained from the plant had considerable irritating properties when introduced into the eye, but this was not the case when it was obtained by synthesis. The specimen of the synthetically prepared alkaloid, in the form of hydrochlorate, was made into a 3 per cent. solution, and tested by the author. It was found most efficient for inducing anæsthesia of the cornea, and had the advantage of causing no dilatation of the pupil, and none of the ischæmia characteristic of the action of cocaine. There was no disturbance of accommodation following its use. As an anæsthetic to the lid before applying mitigated stick or lapis divinus, a 10 per cent. solution had been found as successful as a corresponding strength of cocaine. This had been found sufficient in such operations as strabismus, division of stricture of lacrymal duct, and opening of Meibomian cysts. Tropa-cocaine had the following advantages as compared with cocaine: it caused no dilatation of the pupil, and no disturbance of accommodation; it was much less poisonous than cocaine, and did not, if swallowed, produce delirium. The vascular condition of the eye was not affected by it, and in the form of a solution it kept better than cocaine.

Spontaneous Rupture of Capsule after Iridectomy preliminary to Cataract Extraction.—This paper was read by the Secretary for Mr. J. T. Rudall (Melbourne). Five months after an uncomplicated preliminary iridectomy it was found that the cortex of the lens had undergone partial absorption,

allowing a clear space between the nucleus, which appeared to be somewhat tilted backwards, and the upper edge of the cornea. It was probable that a limited spontaneous rupture of the capsule had taken place. Fearing that the nucleus of the lens might fall back into the vitreous, the author removed it with a vectis. No vitreous was lost, and the recovery was uncomplicated.

Extreme Hyphæma of both Eyes with Corneal Abscess of Right Eye occurring as a Sequela of Small-pox.—This paper was read by the Secretary for Mr. Kenneth Scott (Cairo). Ten months before admission into the Kasr-el-Aïni Hospital the patient, a boy aged 9, had been attacked by small-pox, which was immediately followed by loss of vision in both eyes. At the time of admission there was a circumscribed abscess of the centre of the right cornea, the anterior epithelium being intact. There was no pain nor lacrymation, and only moderate injection. The anterior chambers of both eyes were filled with a dark red brown mass, completely concealing the iris. There was no trace of irritation of the left eye. The tension of both eyes was normal. Vision equalled perception of light. After seven weeks' treatment the corneal abscess disappeared, and the upper third of the red brown mass in both anterior chambers had become of a light buff colour, and quite transparent. The patient was kept under observation three months longer, but the eyes remained in exactly the same condition.

Card Specimens.—The following were the card specimens: Messrs. Critchett and Juler: A Case of Pemphigus of the Conjunctiva.—Mr. G. Anderson Critchett: A Case of Conical Cornea treated by the Galvano-Cautery without Perforation.—Mr. Juler: A Case of Central Colloid Changes in the Retina.—Mr. Frederick Bass: A Pocket Refraction Case.—Dr. Rayner Batten: Persistent Hyaloid Artery branching in Vitreous.—Mr. Donald Gunn: A Case of Syphilitic Conjunctivitis.

ERRATUM.

Page 311, lines 20, 21, 22 and 26 *for* dorsal *read* dural.

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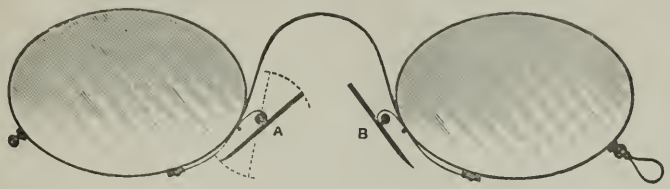

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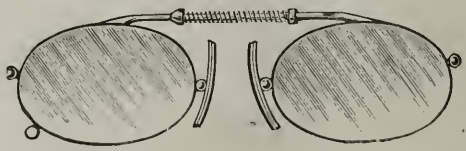

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